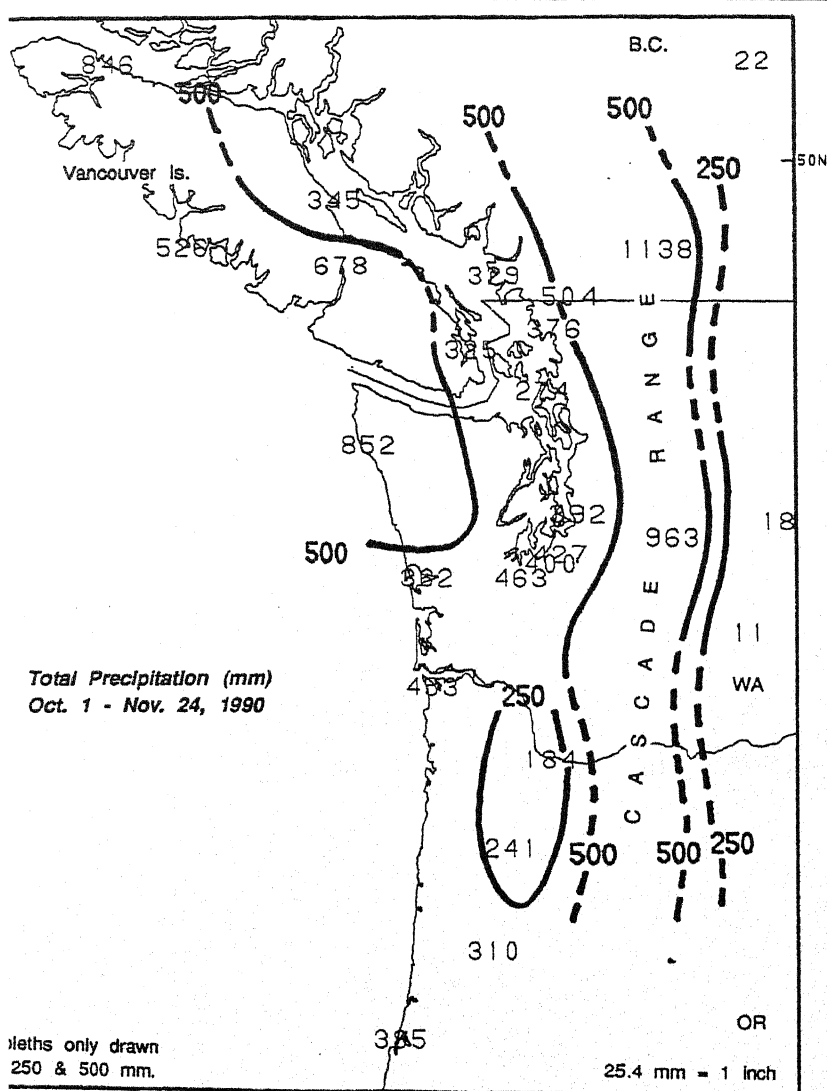


WEEKLY CLIMATE BULLETIN

10/47

Washington, DC

November 24, 1990



The 1990 - 1991 rainy season (approximately Oct. - Apr.) in the Pacific Northwest has gotten off to a quick but destructive start. Since October 1, many locations in the Pacific Northwest and southwestern British Columbia have measured between 125% and 325% of the normal precipitation, with 8 - week totals approaching 1150 mm [45"]. The ample precipitation generated by a subtropical storm track dubbed the "Pineapple Express" has produced severe flooding in the region for the second time in two weeks. A massive storm during Nov. 9 - 12 caused tens of millions of dollars in damages in western Washington and Vancouver Island, and the combination of recent heavy rains (up to 9 inches in 24 - hours) and melting snows have forced nearly every river and stream in the western part of the state from Chehalis northward to flood. According to news reports, more than a thousand people fled their homes on Saturday, and storm - whipped waves sank part of the Interstate 90 floating bridge that crossed Lake Washington just east of Seattle.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

STAFF

Editor	David Miskus
Associate Editor	Richard J. Tinker
Contributors	Joe Harrison
	Paul Sabol
	David Stutzer
Graphics	Robert H. Churchill

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF MARCH 6, 1993

1. Northern United States:

COLD AIR REMAINS ENTRENCHED.

Temperatures averaged 4°C to 10°C below normal, with the greatest negative departures scattered across the northwestern U.S. Farther north, unseasonably mild conditions continued through Alaska and south-central Canada [3 weeks].

2. Southwestern United States:

WET WEATHER ENDS.

Generally less than 20 mm of rain fell on Arizona and southern California as six-week moisture surplus dropped below 80 mm [Ended at 11 weeks].

3. East-Central South America:

HEAVY RAINS CONTINUE.

As much as 180 mm of rain inundated parts of interior southern Brazil while up to 60 mm was measured in Uruguay. During the last six-weeks, precipitation totals were two to three times normal amounts [4 weeks].

4. Western Europe:

RAINS BRING LIMITED RELIEF.

Abundant rains of up to 80 mm across the western and central Mediterranean Rim brought some relief from the abnormal dryness, but farther north amounts were generally below 20 mm [15 weeks].

5. Southern Europe and Northern Africa:

UNUSUALLY CHILLY WEATHER PERSISTS.

Temperatures remained 4°C to 6°C below normal in most of southwestern Europe. Departures approached -11°C at isolated locations in northwestern Africa. Farther east, however, near to above normal temperatures prevailed in Italy, Greece, Turkey, and the Middle East [15 weeks].

6. Qatar, Oman, and Bahrain:

WET WEATHER EASES.

Generally less than 10 mm of rain was reported last week, but isolated locations in Iran recorded as much as 50 mm. Six-week moisture surpluses, however, still ranged from 50 to 170 mm [10 weeks].

7. Southeastern Africa:

HEAVY SHOWERS SHIFT SOUTHWARD.

Torrential rains (650 to 850 mm in two weeks) inundated northern Madagascar, some of which fell in conjunction with two weak tropical cyclones. Farther west, Mozambique received as much as 170 mm last week, but most areas observed less than 50 mm. In the past six weeks, some locations reported twice their normal amounts [9 weeks].

8. Northwestern Australia:

DRY WEATHER BRINGS RELIEF.

Isolated locations reported 50 to 100 mm of rain, but most of the region received little or none [Ending at 6 weeks].

9. Northeastern Australia:

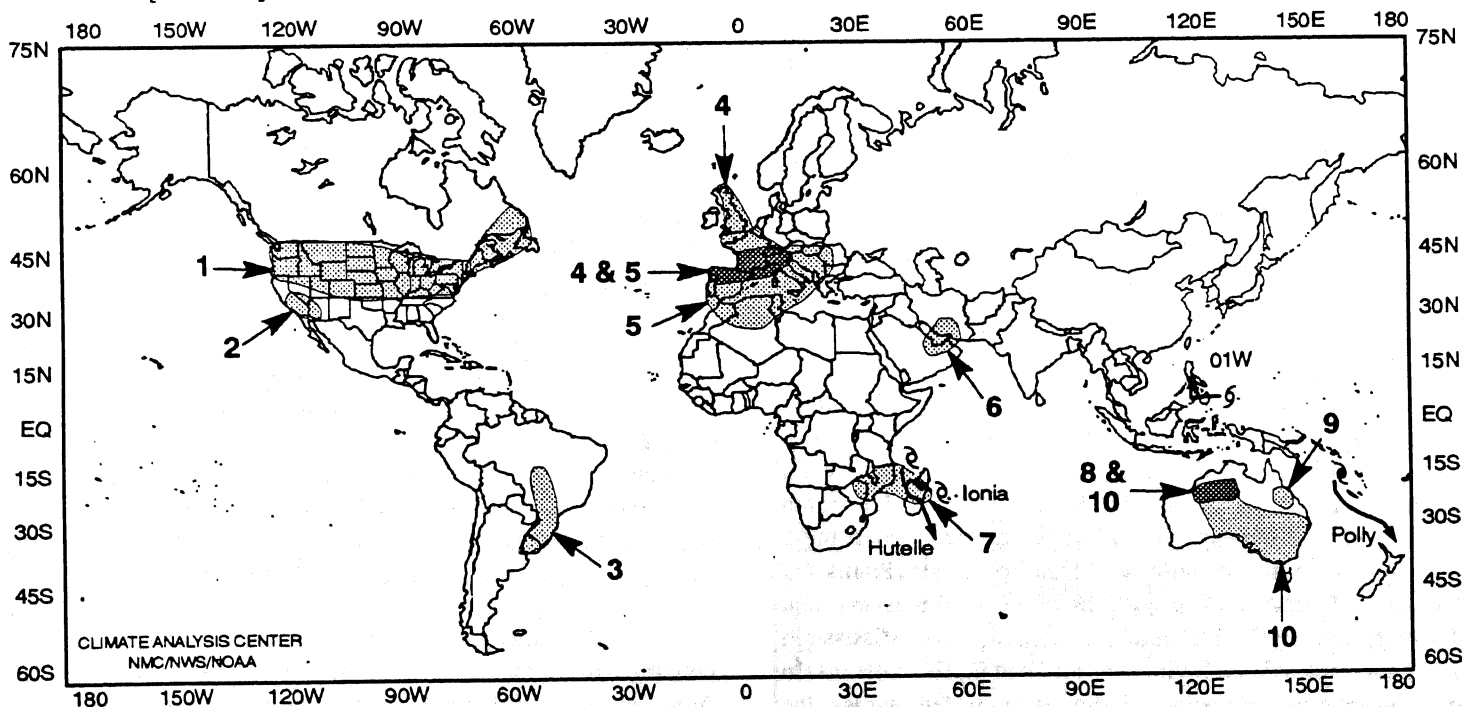
STILL VERY DRY.

Light rainfall (10 to 20 mm) was observed across most of the region, but isolated locations along the coast received as much as 80 mm. Six-week moisture deficits reached 270 mm in some places [6 weeks].

10. Australia:

UNSEASONABLY COOL CONDITIONS DEVELOP.

Temperatures averaged 3°C to 5°C below normal for the second consecutive week [2 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF FEBRUARY 28–MARCH 6, 1993

The transition from meteorological winter (Dec–Feb) to meteorological spring (Mar–May) was accompanied by stormy weather across much of the contiguous U.S. A strong storm system dumped heavy snow from the southern Intermountain West to the central Plains and generated heavy rains across the lower Mississippi Valley. Up to three feet of snow buried Cuchara, CO while more than four inches of rain soaked portions of Texas, Louisiana, and Mississippi, causing localized flooding. Meanwhile, continued flooding along the Gila River in Arizona forced the closure of numerous roads and the evacuation of more than 1000 people. In addition, a powerful storm system buffeted the East, generating heavy rains and snows, hurricane-force winds, and extensive flooding. More than six inches of rain deluged western Virginia on Thursday, and flooding was reported across much of West Virginia, Virginia, and Maryland. Dozens of roads were closed in West Virginia as rivers and streams overflowed their banks. Farther north, heavy snow blanketed the Northeast. More than a foot of snow buried parts of Pennsylvania, the higher elevations of Maryland, and Connecticut. Strong winds accompanied the storm, downing numerous trees and power lines in the central Appalachians, mid-Atlantic, and southern New England. Wind gusts up to 75 mph were observed at LaGuardia Airport in New York City, NY on Thursday night. Farther south, severe thunderstorms erupted across the south Atlantic, generating heavy rain and spawning two tornadoes in Florida. In the wake of the system, unseasonably cold conditions gripped much of the over 48 states. More than a dozen record daily lows were established from the deep South to the Intermountain West as below-freezing readings dipped as far south as central Texas. In sharp contrast, unusually warm weather prevailed from the northern High Plains to the northern Great Lakes. Half a dozen record daily highs were set in Michigan and Minnesota as readings soared into the fifties. In Alaska, exceptionally warm weather enveloped most of the state for the fourth consecutive week.

The week began with a storm system in Arizona that dumped up to six inches of snow on Flagstaff, AZ. Farther south, it aggravated flooding along the Gila River. The disturbance moved through the southern Rockies and into the southern Plains spreading heavy snow across Colorado and Kansas. It then buried southwestern Colorado while half a foot fell in Kansas. The system then continued eastward, tracking through the Mississippi Valley by Tuesday and producing a large amount of precipitation across the east central Plains and heavy rain in portions of Texas, Louisiana, and Mississippi. Nearly five inches of rain deluged parts of Mississippi and street flooding was reported in New Orleans. In the rest of the country, relatively tranquil conditions prevailed across the two-thirds of the nation. Unseasonably cold weather brought a dozen record daily lows from Idaho to Kentucky. However, unusually mild conditions generated half a

dozen record daily highs in Michigan and Minnesota on Monday and Tuesday.

During the last half of the week, the low in the Mississippi Valley tracked to southern New England and weakened; however, a second low developed farther south in Georgia. This system intensified rapidly and tracked northeastward and eventually off the mid-Atlantic coast. Heavy rains soaked the southern and middle Atlantic coast while heavy snows buried portions of the central Appalachians and Ohio Valley and most of the Northeast. Strong winds buffeted much of the East, uprooting trees, downing power lines, and damaging roofs. In Kingwood, WV, strong wind gusts toppled a mobile home, blew a tractor trailer over, and ripped the roof off of a building. Meanwhile, heavy rains caused extensive flooding in the Virginias and a small mud slide in Maryland. Farther north, heavy snow and strong wind gusts created blizzard-like conditions across parts of the Northeast on Friday and Saturday.

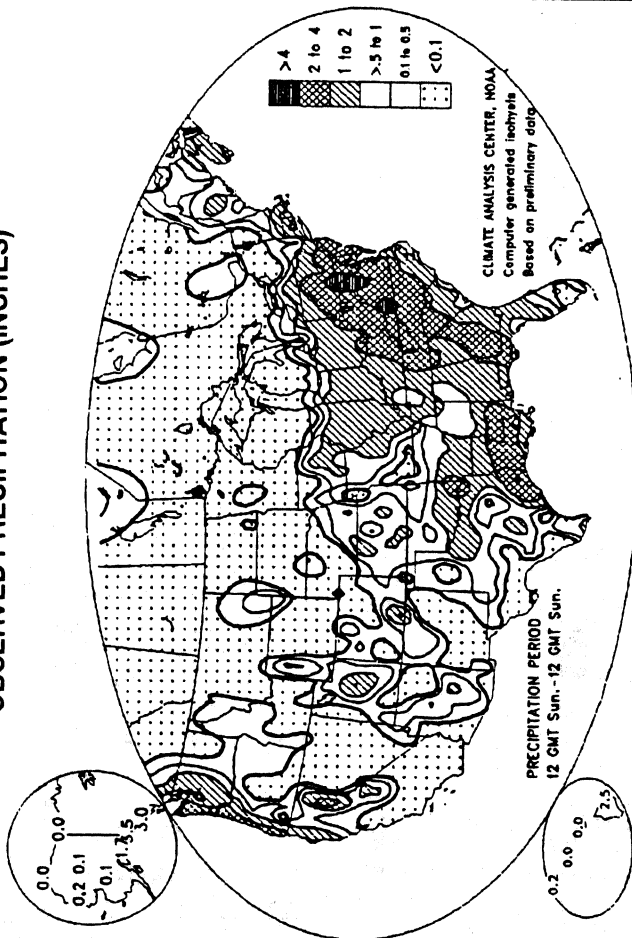
According to the River Forecast Centers, the greatest weekly precipitation (over two inches) fell from eastern Texas eastward to the Florida panhandle and northeastward through the central Appalachians and middle Atlantic coast. In addition, totals exceeded two inches at scattered locations in the Red River Valley of southern Oklahoma and northeastern Texas, the central Rockies, the Sierra and northern Cascade ranges, the Alaskan panhandle, eastern Hawaii, and the northern and central Pacific coast. Light to moderate totals were measured in the Northeast, the Ohio and middle Mississippi Valleys, the central Plains, and the remainders of the southern Plains, the lower Mississippi Valley, the Southeast, the mid-Atlantic, the central Rockies, northern California, the Pacific Northwest, and southern Alaska. Little or no precipitation was reported in the Great Lakes, the northern Mississippi Valley, the northern Plains, the northern and central Rockies, the Intermountain West, southern California, and the remainders of Alaska and Hawaii.

Warmer than normal conditions prevailed from the northern Rockies eastward to the upper Great Lakes, along the Pacific seaboard, and in portions of the Great Basin and central Rockies. Weekly departures of +6°F to +18°F were observed from Montana to northern Michigan. In Alaska, abnormally mild weather continued across most of the state, with weekly departures reaching +13°F in east-central portions. In Hawaii, above normal temperatures prevailed in the central and western islands.

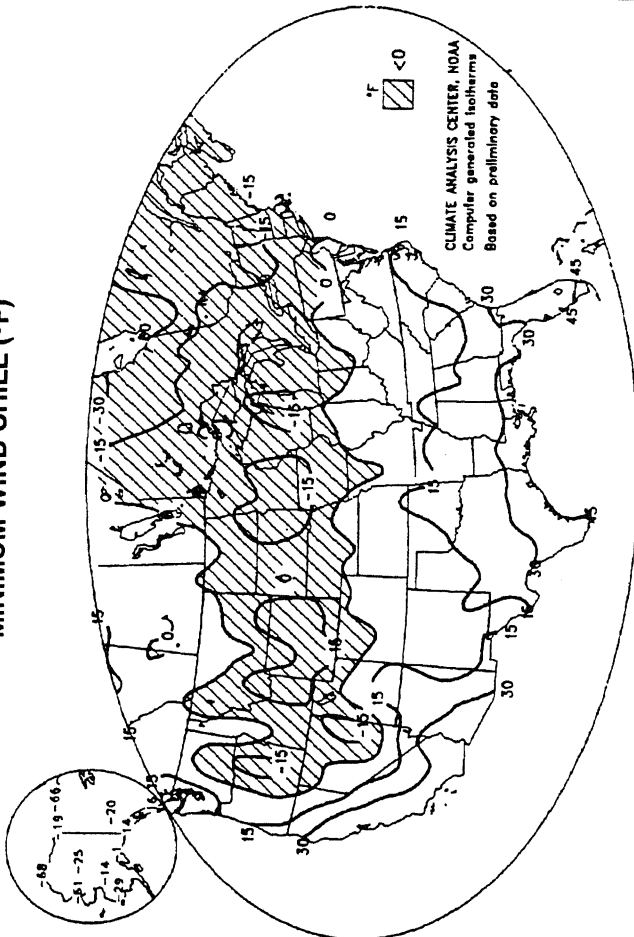
Unseasonably cold weather dominated the rest of the country, with temperatures averaging 10°F to 16°F below normal from eastern Washington and eastern Oregon to western Wyoming. In Alaska, below normal temperatures were limited to scattered locations in western sections of the state. Below normal temperatures were also reported on the Big Island of Hawaii.

UNITED STATES WEEKLY CLIMATE CONDITIONS (February 28 – March 6, 1993)

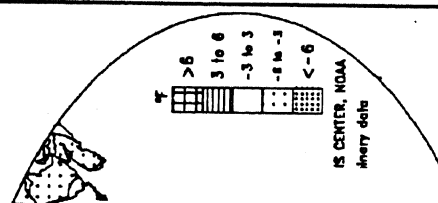
OBSERVED PRECIPITATION (INCHES)



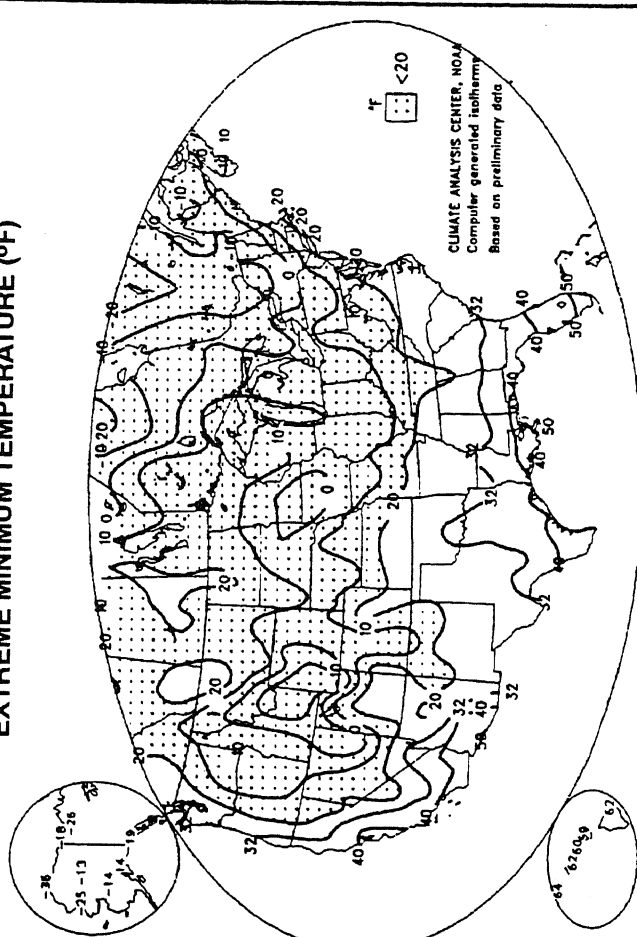
MINIMUM WIND CHILL (°F)



DEPARTURE OF AVERAGE TEMPERATURE

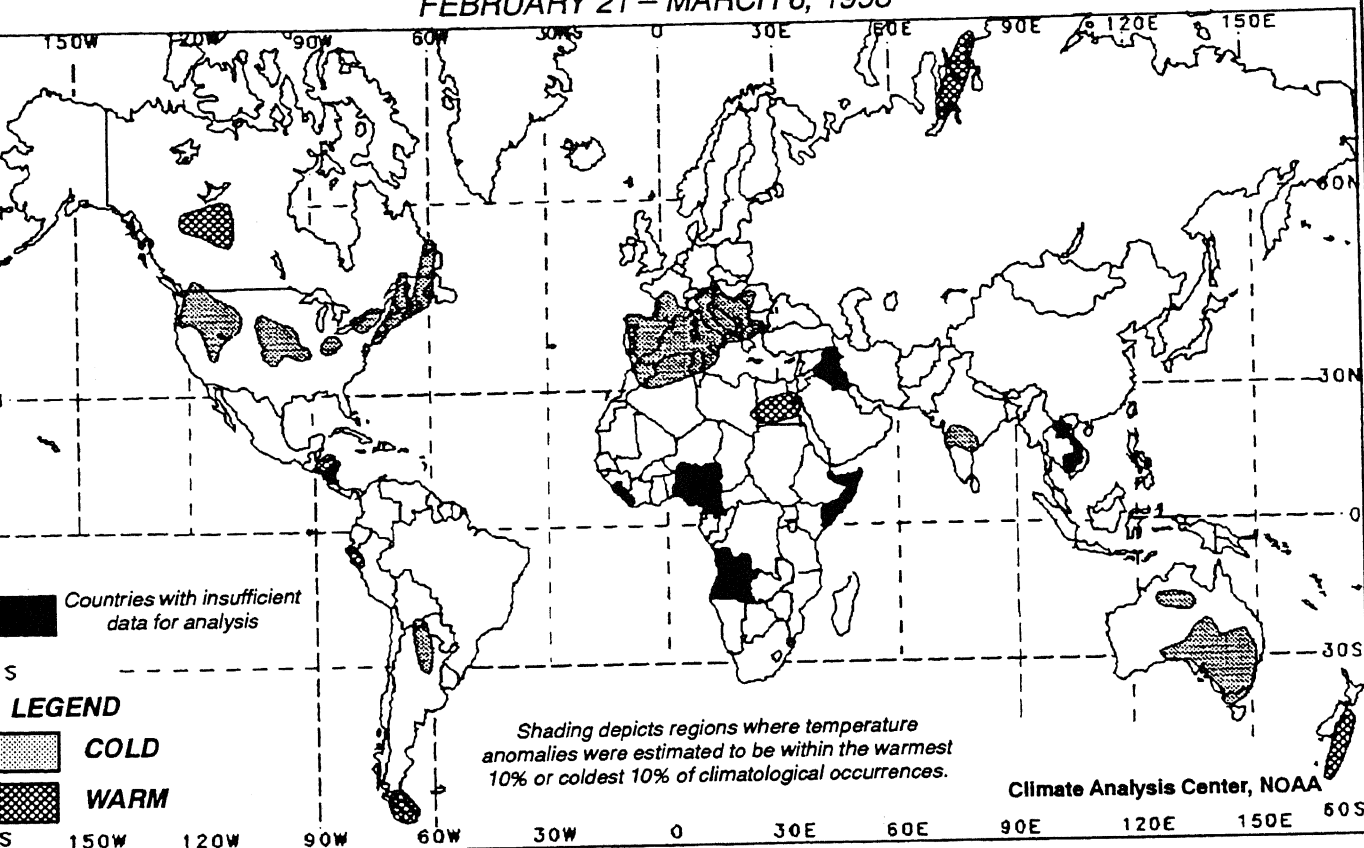


EXTREME MINIMUM TEMPERATURE (°F)



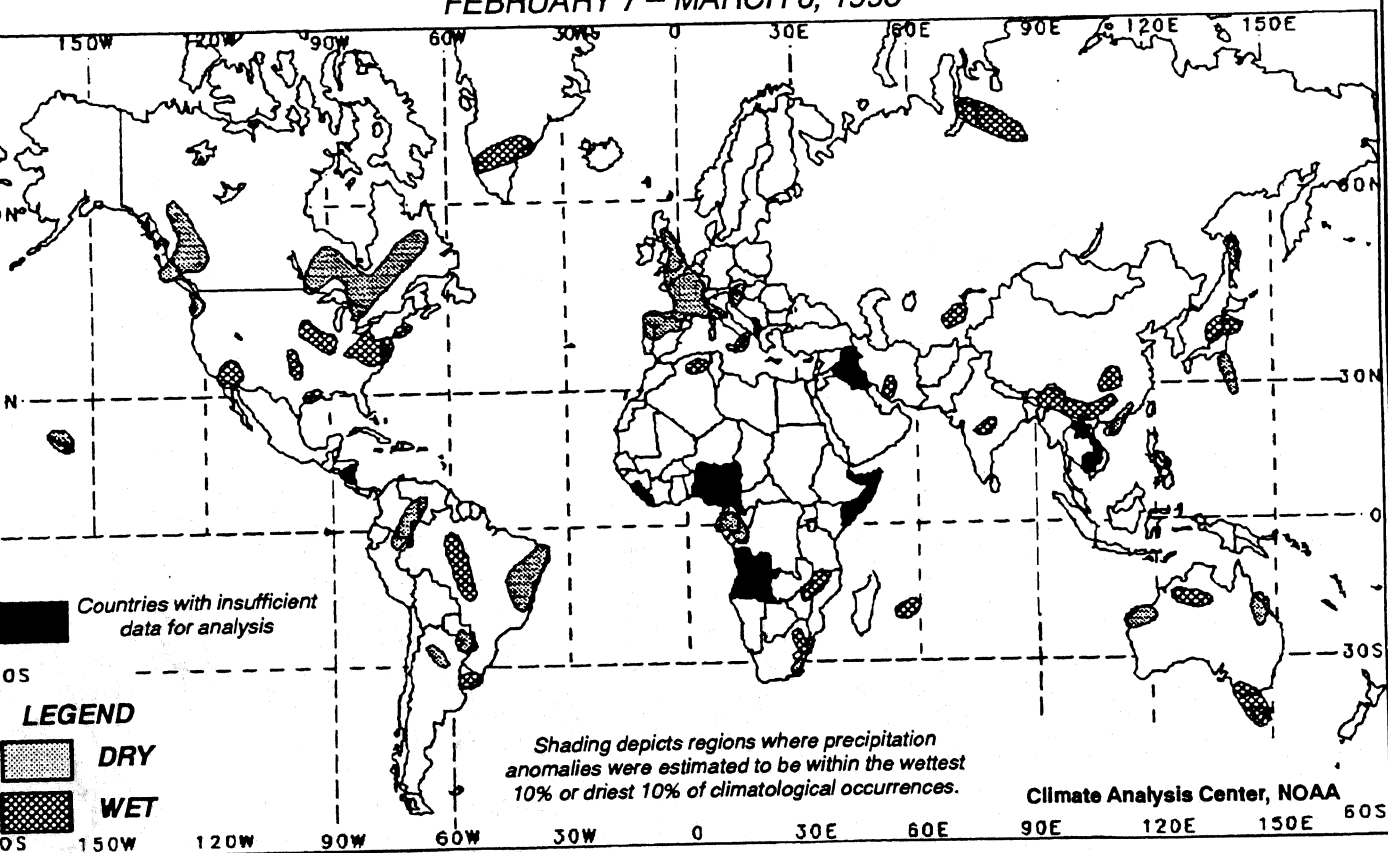
TWO-WEEK GLOBAL TEMPERATURE ANOMALIES

FEBRUARY 21 – MARCH 6, 1993



FOUR-WEEK GLOBAL PRECIPITATION ANOMALIES

FEBRUARY 7 – MARCH 6, 1993



UNITED STATES MONTHLY CLIMATE SUMMARY

FEBRUARY 1993

The commencement of the final month of meteorological winter featured unusually mild and tranquil conditions for a large part of the contiguous United States. The mercury soared to 60°F as far north as the middle Mississippi Valley and mid-Atlantic. In sharp contrast, wintry weather prevailed across the Northeast as some of the coldest air of the season plunged southward out of Canada. Numerous locations reported subzero lows, and strong wind gusts combined with low temperatures to produce wind chills of -30°F to -50°F. More than a foot of snow blanketed parts of northern New England. Farther north, bitterly cold conditions also gripped most of Alaska as temperatures dropped below -60°F in the central interior. Hawaii also experienced below normal temperatures at the beginning of the month.

In sharp contrast to the first week of the month, stormy weather battered much of the country as mid-February approached. A winter storm trekked from the Far West to the Atlantic Coast, generating urban flooding and landslides in southern California, then dumping up to half a foot of snow on large parts the Great Basin, the Rockies, the central Plains, and the Northeast. Subzero lows were common in the Northeast, with nearly a dozen new daily records established. Conditions changed abruptly across Alaska, where unusually mild weather prevailed following three weeks of brutally cold conditions.

The third week of February again featured wintry weather across much of the contiguous United States. Heavy snow blanketed many areas from the Rockies to the Northeast while abnormally cold conditions produced around three dozen record daily lows from the northern Rockies to the deep South. Subzero lows reached as far south as Oklahoma while freezing temperatures gripped northern Florida. Up to two feet of snow buried parts of the middle Mississippi Valley, the biggest snowfall in a decade for some locations. Stormy weather also encumbered the Far West as a series of strong systems delivered heavy rains, excessive mountain snows, and strong wind gusts to much of California. Unseasonably mild weather continued across most of Alaska while unusually cool conditions prevailed in Hawaii.

Another major winter storm spread heavy snow from California to the mid-Atlantic during the final week of meteorological winter, burying parts of the West, central Rockies, middle Mississippi Valley, and Appalachians under more than a foot of snow. Farther southeast, severe thunderstorms spawned tornadoes that took several lives, according to press reports. More stormy weather in the Far West abetted flooding along the rain-swollen Gila River in Arizona. Up to \$20 million in damage, including widespread deterioration of the iceberg lettuce crop, resulted from the floods, according to state officials. Abnormally cold conditions dominated the country, except southern Texas, while Alaska enjoyed unseasonably mild weather.

According to the River Forecast Centers, heavy precipitation (over four inches) fell on much of the Far West, the desert Southwest, the

central Rockies, the southern Plains, the deep South, the Ohio Valley, the southern and central Appalachians, and scattered parts of upstate New York and northern New England (page 6). In Alaska, as much as 17 inches of precipitation inundated the panhandle. Based on preliminary calculations from the National Climatic Data Center (NCDC), only three of the nation's nine regions reported above median precipitation, with the Southwest and the state of Arizona both reporting the 4th wettest February since records began in 1895 (page 7). New February records for total precipitation were established at Las Vegas, NV and Albuquerque, NM (page 10). For the first two months of the year, Arizona had the wettest and New Mexico the 2nd wettest such period since records began in 1895. Farther north, Nevada and Utah endured the 4th wettest January - February on record. Wet weather in the desert Southwest dates back more than a year at some locations. Between two and three times the normal amount was measured in most of southern California and Arizona since the beginning of 1992.

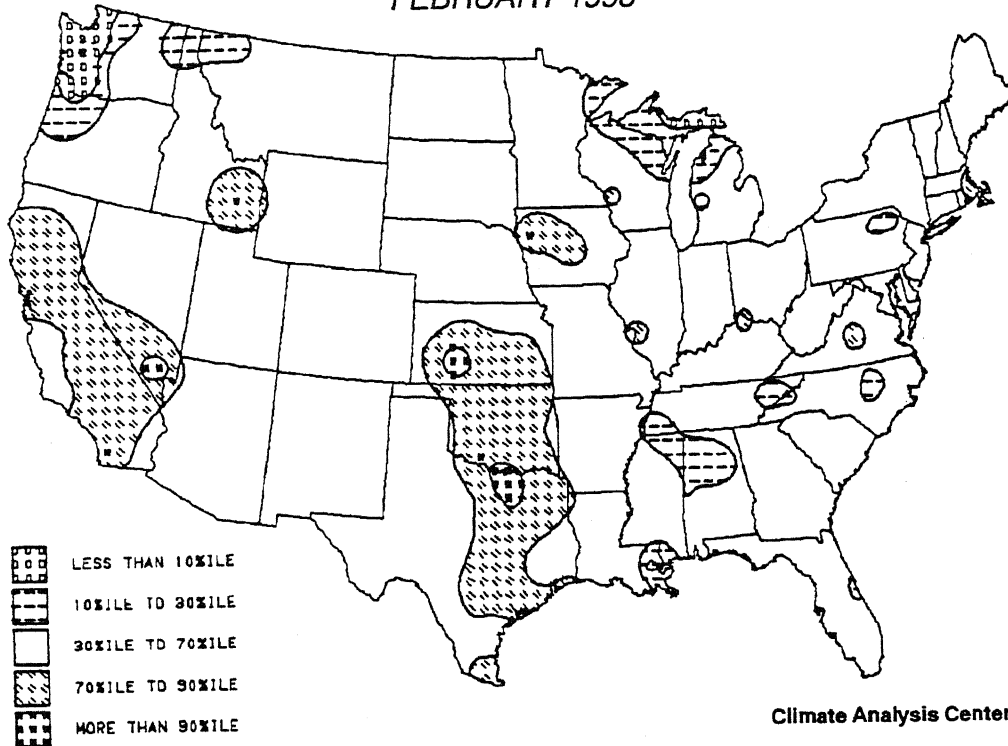
In contrast, subnormal precipitation totals were observed from the central Gulf Coast northeastward to the mid-Atlantic and across western sections of Washington and Oregon (page 6). Totals were generally below two inches from eastern Washington and Oregon eastward to Michigan. Six of the nine NCDC regions reported submedian precipitation, with the Northwest ranking 15th driest (page 7). Washington state had the 2nd driest February in 99 years of record, and several locations in the Northwest recorded the driest February on record (page 10). Most of Hawaii was also quite dry for the second month in a row. The Islands received less than 25% of normal totals, with amounts generally below three inches.

Abnormally cold weather dominated most of the United States during February, with departures approaching -14°F in Wyoming and -11°F in upstate New York and northern New England (page 8). In addition, unusually cool conditions prevailed across the Hawaiian Islands. According to NCDC, all nine regions reported submedian temperatures, with the Northwest ranking 7th coldest (page 9). Farther east, the West North Central and the Northeast experienced the 11th and 13th coldest February in 99 years of record. Of the 48 contiguous states, 43 observed submedian monthly mean temperatures, with Maine, Oregon, and Illinois experiencing the 3rd, 4th, and 7th coldest February since 1895. Montana ranked 8th while four other states (NE, NV, VT, and WY) had the 9th coldest such month on record. The first two months of the year across the 48 contiguous states averaged colder than normal for the first time in four years (page 10).

Unseasonably mild conditions prevailed throughout Alaska, with departures reaching +13°F in the southwestern part of the state, but were restricted to parts of the southern Plains and Rockies in the contiguous states. Temperatures averaged 2°F to 5°F above normal in portions of New Mexico and Texas (page 8). Only five states (AZ, MS, NM, TX, and WI) observed above-median monthly temperatures, based on the 99-year historical distribution.

PRECIPITATION PERCENTILES

FEBRUARY 1993

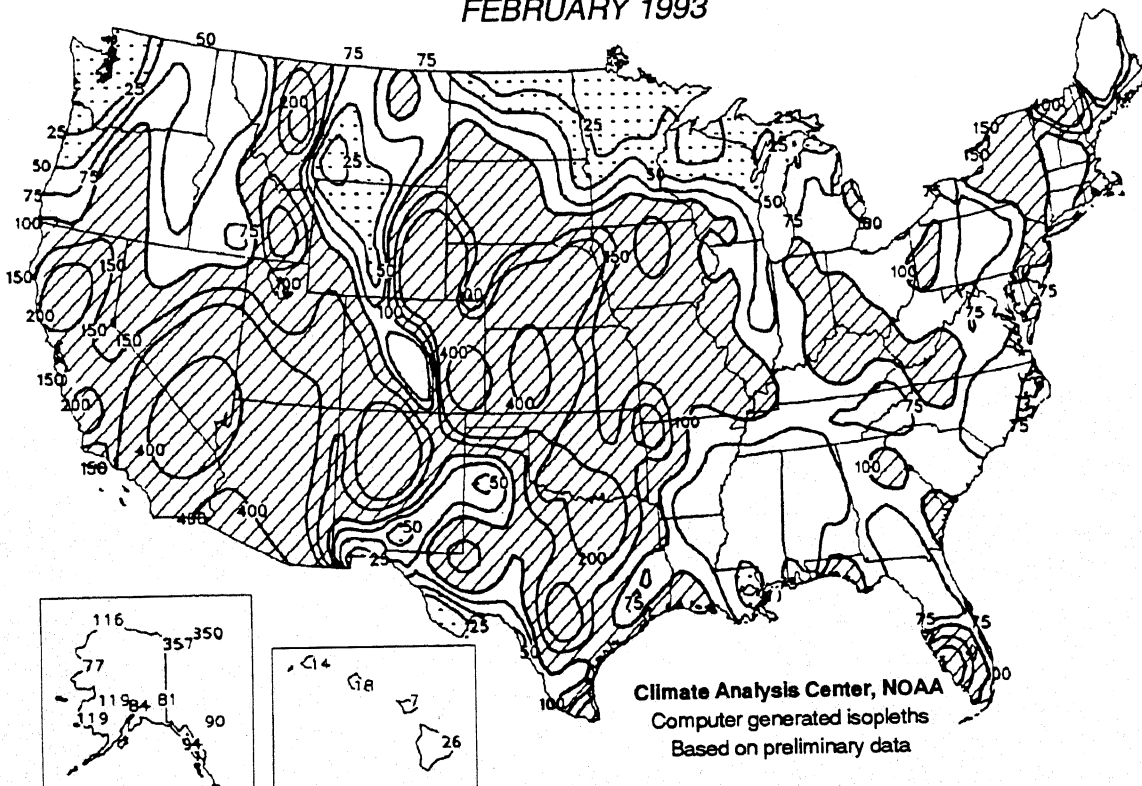


Climate Analysis Center, NOAA

FEBRUARY 1993 Precipitation Percentiles. A wet month (>70%ile) was observed in the Southwest, the central and southern Plains, and parts of Idaho and Iowa, with totals among the wettest 10% of the historical (1961–1990) distribution recorded in southern Nevada, north-central Texas, and south-central Kansas. Climatologically significant dryness (<30%ile) was limited to the Pacific Northwest, upper Great Lakes, and southern Appalachians. Upper Michigan and western Wisconsin reported totals in the driest 10%ile.

PERCENT OF NORMAL PRECIPITATION

FEBRUARY 1993



Climate Analysis Center, NOAA
Computer generated isopleths
Based on preliminary data

FEBRUARY 1993 Percent of Normal Precipitation. Hatched areas received above normal precipitation, and dotted areas reported under half of normal. Abnormally wet weather dominated most of the country, except for the northern tier of states, the Great Lakes, the deep South, and the mid-Atlantic region. Unusually low amounts were restricted to the Pacific Northwest and upper Great Lakes.

FEBRUARY 1993



Based on preliminary data generated by the National Climatic Data Center

This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

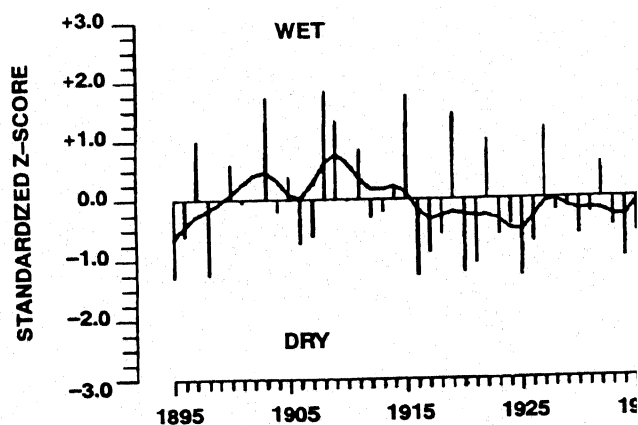
FEBRUARY 1993



Based on preliminary data generated by the National Climatic Data Center

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This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on r

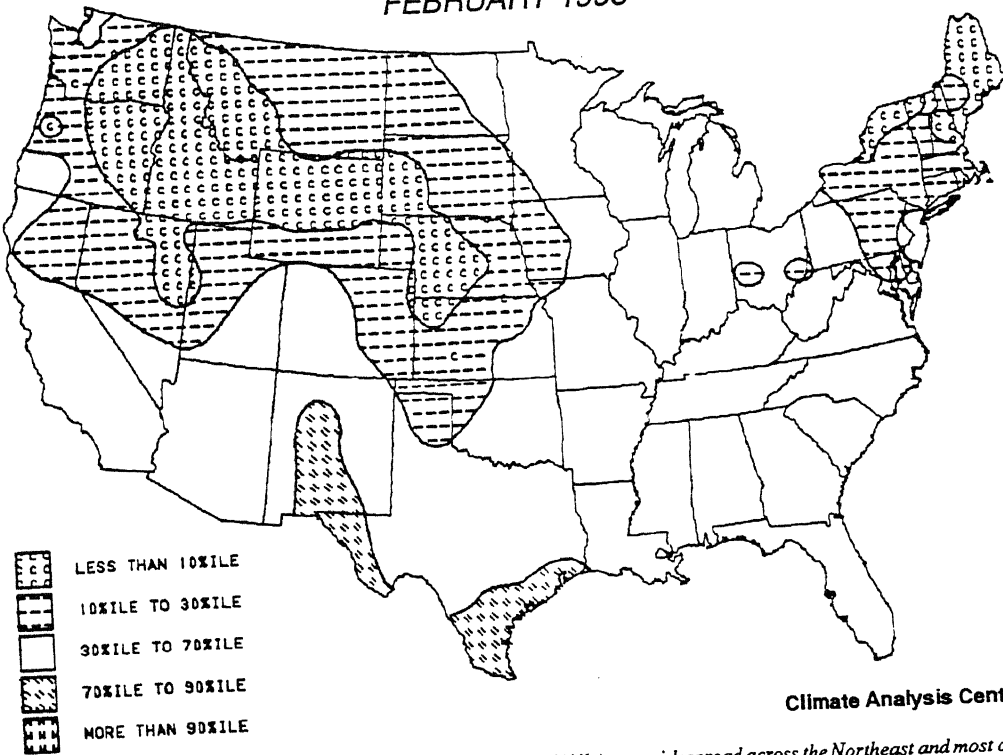
FEBRUARY, 1895 - 1993



NATIONAL FEBRUARY PRECIPITATION INDEX, as computed by
ruary on record. This index takes local normals into account so that regi

TEMPERATURE PERCENTILES

FEBRUARY 1993

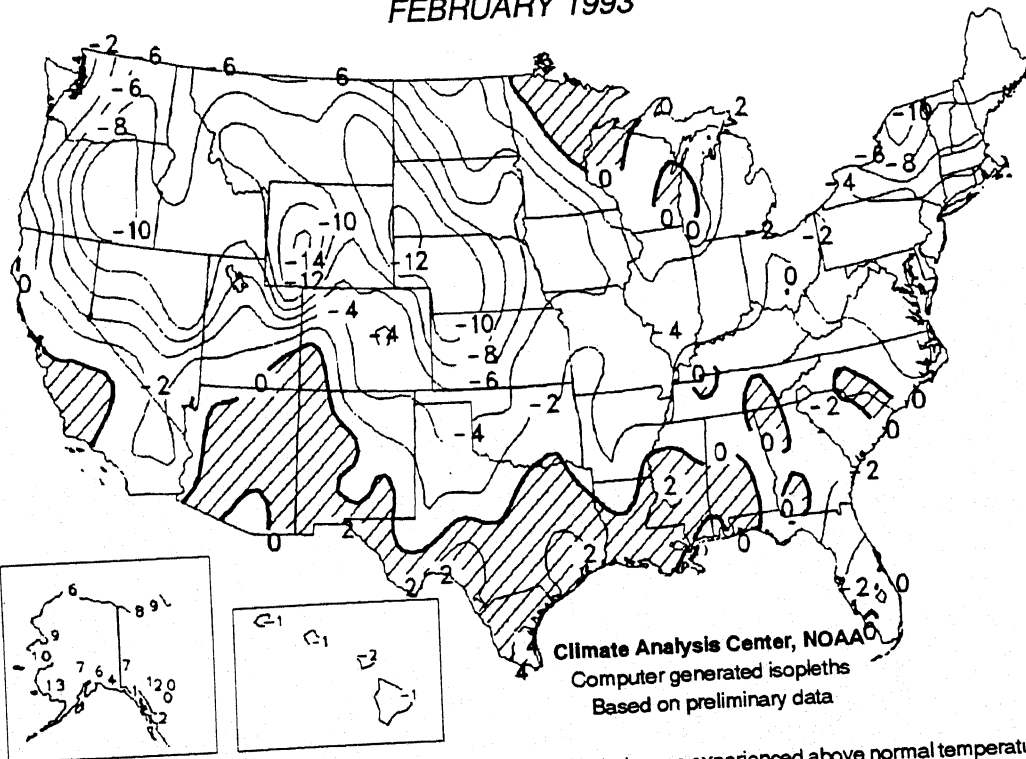


Climate Analysis Center, NOAA

1993 Temperature Percentiles. Unseasonably cold weather (<30%ile) was widespread across the Northeast and most of the western and central United States from Washington southeastward to the Texas Panhandle. Monthly mean temperatures were among the coldest 10% of the historical (1961-1990) distribution in New England and upstate New York and across the northern Rockies and central High Plains. Unseasonably mild weather (>70%ile) was reported in southern Texas.

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

FEBRUARY 1993

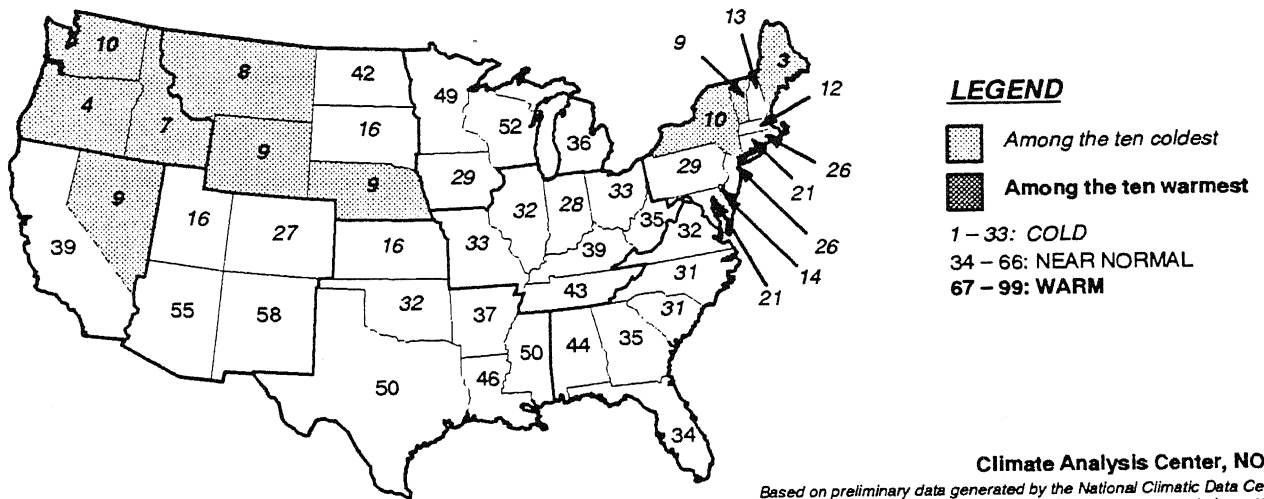


Climate Analysis Center, NOAA
Computer generated isopleths
Based on preliminary data

FEBRUARY 1993 Departure of Average Temperature from Normal (°F). Shaded areas experienced above normal temperatures. Abnormally cold temperatures dominated the nation, with monthly mean temperatures averaging 10°F to 14°F below normal across the northern and central Rockies, the Great Plains, and New England. In contrast, above normal temperatures covered to the upper Great Lakes and the southern tier of states, with departures of +2°F to +4°F in southern Texas.

HISTORICAL TEMPERATURE RANKINGS BY STATE

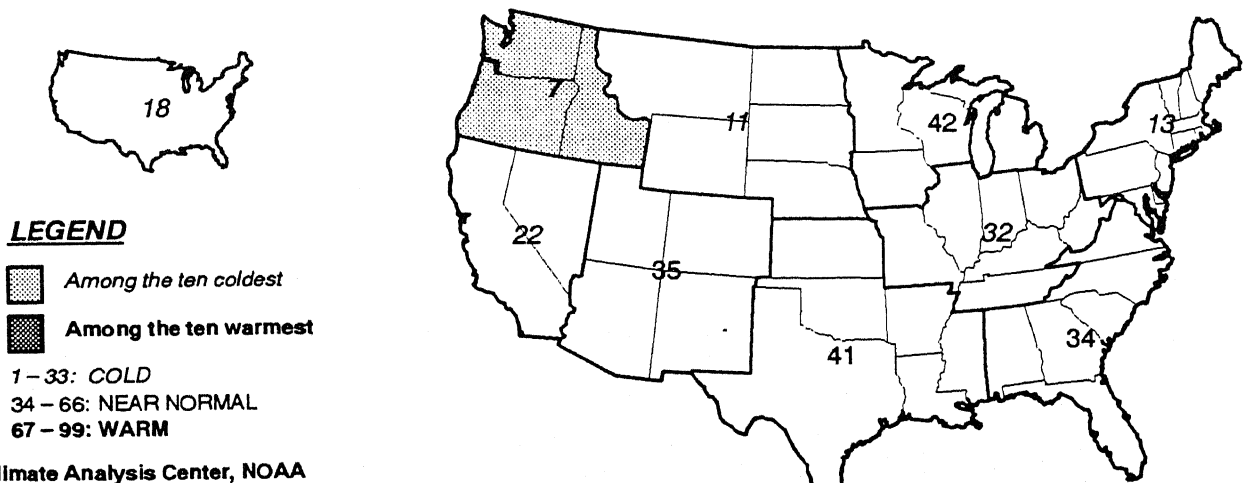
FEBRUARY 1993



Based on preliminary data generated by the National Climatic Data Center
This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

HISTORICAL TEMPERATURE RANKINGS BY REGION AND NATION

FEBRUARY 1993

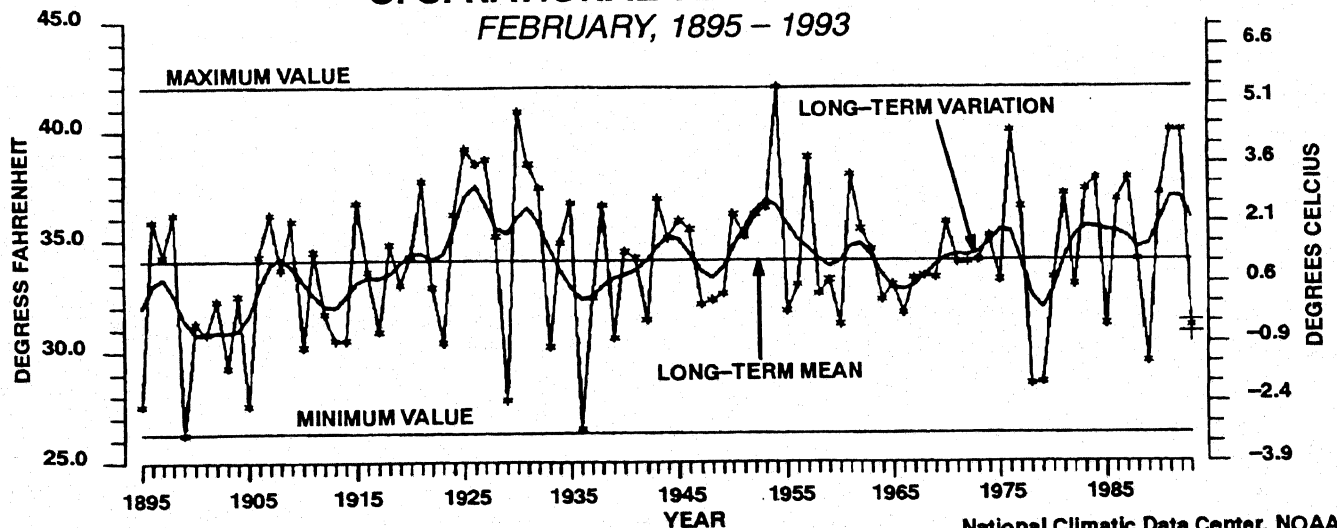


Climate Analysis Center, NOAA

Based on preliminary data generated by the National Climatic Data Center
This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

U. S. NATIONAL TEMPERATURE

FEBRUARY, 1895 - 1993



NATIONALLY AVERAGED FEBRUARY TEMPERATURES, as computed by the National Climatic Data Center. Below normal temperatures dominated the nation during February, the coldest such month since 1989 and the 18th coldest on record for the 48 contiguous states.

TABLE 1. RECORD FEBRUARY PRECIPITATION

<u>STATION</u>	<u>TOTAL (IN)</u>	<u>NORMAL (IN)</u>	<u>PCT. OF NORMAL</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Las Vegas, NV	2.52	0.48	525.0	HIGHEST	1937
Albuquerque, NM	1.82	0.46	395.7	HIGHEST	1931
Astoria, OR	1.35	7.59	17.8	LOWEST	1951
Quillayute, WA	0.87	12.59	6.9	LOWEST	1966
Seattle, WA	0.35	3.98	8.8	LOWEST	1878
Olympia, WA	0.24	5.77	4.2	LOWEST	1944
Sault Ste. Marie, MI	0.21	1.74	12.1	LOWEST	1941
International Falls, MN	0.10	0.63	15.9	LOWEST	1939

NOTE: Trace precipitation is considered ZERO precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.
***** - Percent of normal not calculable.

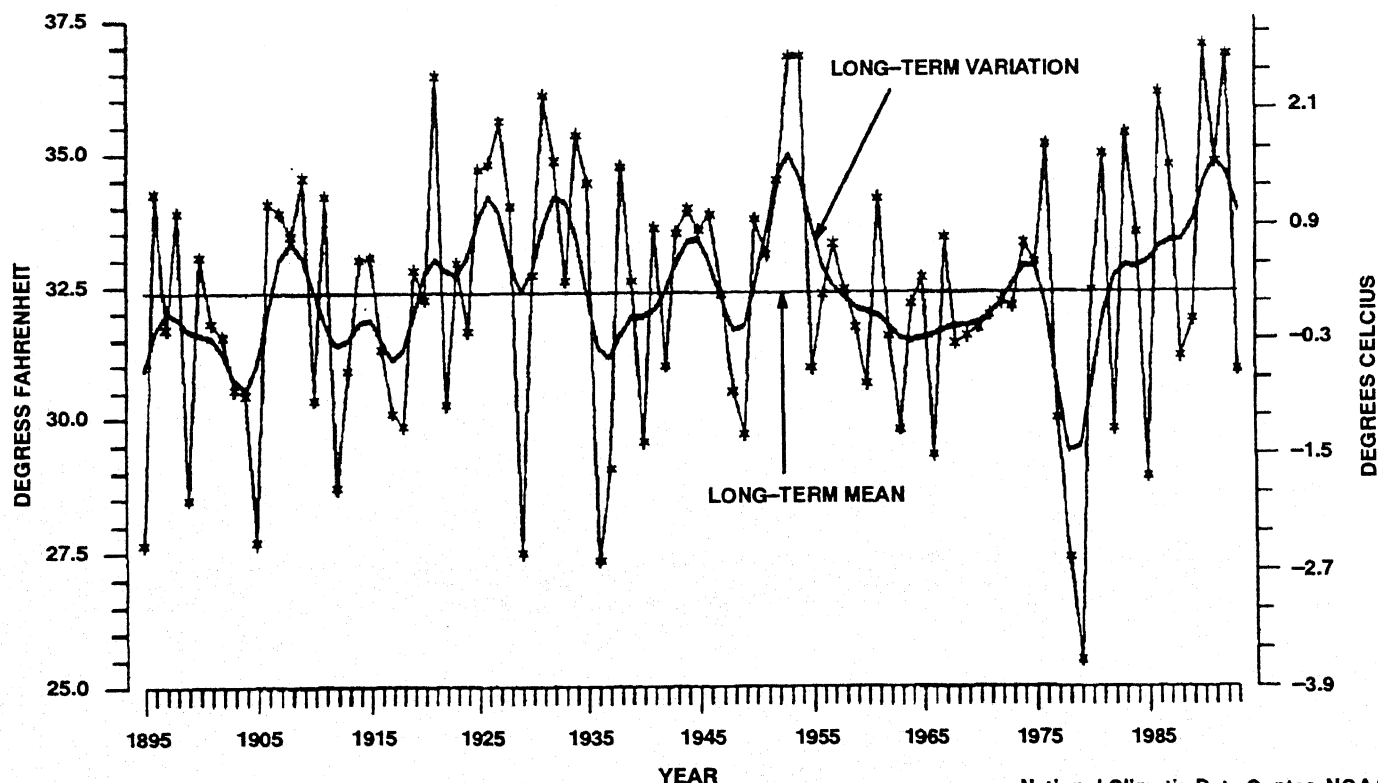
TABLE 2. RECORD FEBRUARY AVERAGE TEMPERATURE

<u>STATION</u>	<u>DEPARTURE (°F)</u>	<u>AVERAGE (°F)</u>	<u>NORMAL (°F)</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Caribou, ME	-7.5	4.3	11.8	LOWEST	1947

TABLE 3. RECORD FEBRUARY EXTREME TEMPERATURE

<u>STATION</u>	<u>EXTREME (°F)</u>	<u>DATE OCCURRED</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Fairbanks, AK	-58	February 2	LOWEST	1930

**U. S. NATIONAL TEMPERATURE
JANUARY - FEBRUARY, 1895 - 1993**



NATIONALLY AVERAGED JANUARY - FEBRUARY TEMPERATURES, as computed by the National Climatic Data Center. The first two months of the year averaged below normal for the first time since 1989 as the coldest such period since 1985 was observed.

SPECIAL CLIMATE SUMMARY

Western Regional Climate Center, Reno, NV
Contact: K. Redmond Phone: (702) 677-3139

Information compiled from:

Soil Conservation Service, State Climate Offices, California
Department of Water Resources, National Climatic Data Center,
and Press Reports

and

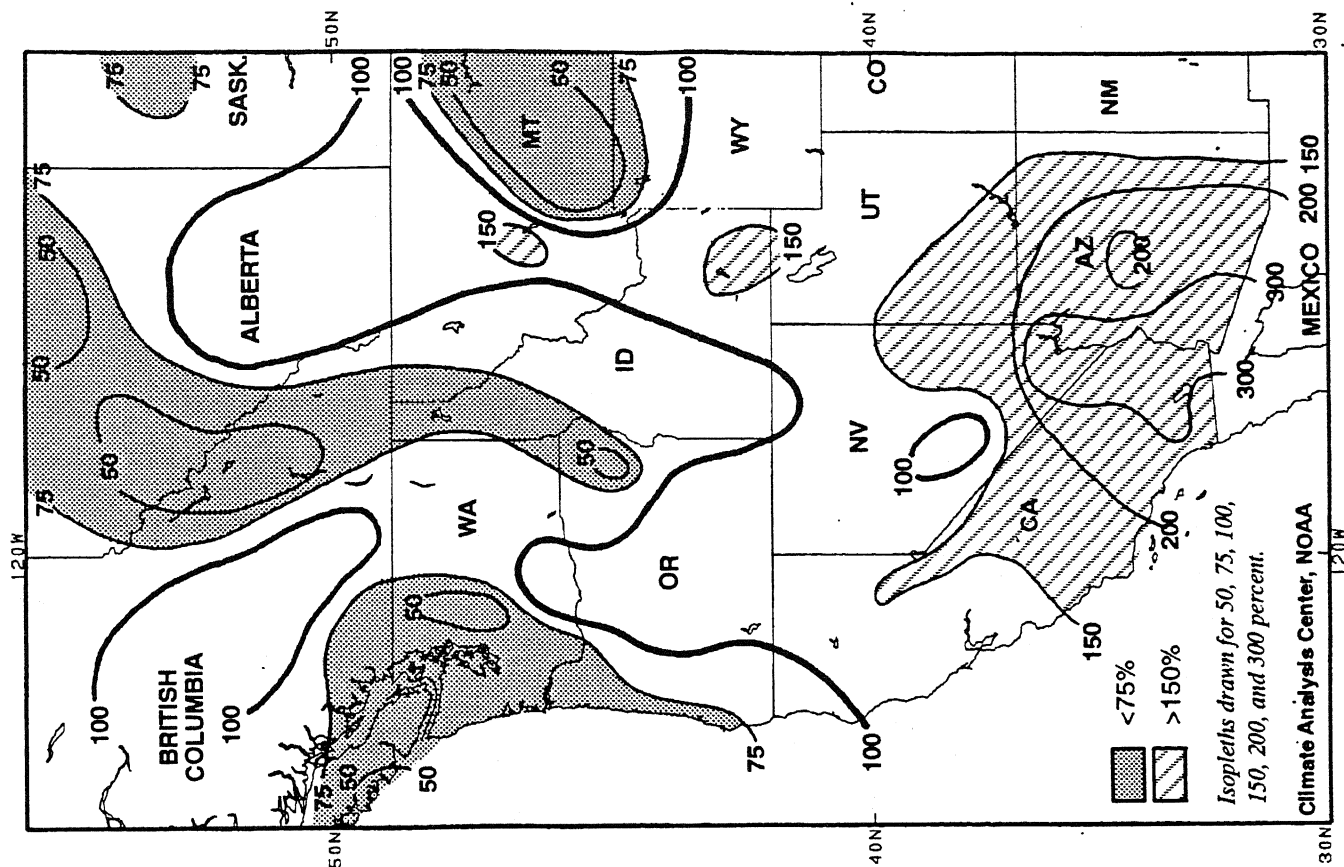
Analysis and Information Branch
Climate Analysis Center, NMC
National Weather Service, NOAA

UPDATE ON THE 1992-1993 WET SEASON IN THE FAR WEST

The 1992-1993 wet season brought long-awaited relief to parts of the West, too much "relief" to some parts, and too little to still other areas. Through March 9, 1993, the precipitation pattern was similar to that observed during the 1991-1992 wet season, with above normal totals in southern areas but drier conditions farther north; however, the line dividing the wet sections from the drier ones is considerably farther north this season (page 11). Parts of the southeastern California deserts received nearly four times normal totals for October 1, 1992 - March 9, 1993. Areas receiving under 50%, fell on extreme southeastern British Columbia and southern Alberta. Significant precipitation deficits (over 100 mm) accumulated in southern Washington, and portions of southern Oregon, and 200 - 500 mm were measured in the northern half of the state. Total precipitation through most of Arizona. Total precipitation in the northern sections of northeastern California and extreme northeastern Washington with inundating rainfall in December and January. In January, the Central Valley was 860,400 acre-feet, and the Sacramento Valley received more cloud-burst precipitation than any other area. The region's ice-cold temperatures caused widespread flooding. In addition, street flooding occurred in California and Arizona.

Significant precipitation deficits occurred in the northern half of the state, and in the southeastern California deserts, a greater than normal precipitation pattern was observed. The precipitation pattern was similar to that observed during the 1991-1992 wet season, with above normal totals in southern areas but drier conditions farther north; however, the line dividing the wet sections from the drier ones is considerably farther north this season (page 11). Parts of the southeastern California deserts received nearly four times normal totals for October 1, 1992 - March 9, 1993. Areas receiving under 50%, fell on extreme southeastern British Columbia and southern Alberta. Significant precipitation deficits (over 100 mm) accumulated in southern Washington, and portions of southern Oregon, and 200 - 500 mm were measured in the northern half of the state. Total precipitation through most of Arizona. Total precipitation in the northern sections of northeastern California and extreme northeastern Washington with inundating rainfall in December and January. In January, the Central Valley was 860,400 acre-feet, and the Sacramento Valley received more cloud-burst precipitation than any other area. The region's ice-cold temperatures caused widespread flooding. In addition, street flooding occurred in California and Arizona.

PERCENT OF NORMAL PRECIPITATION October 1, 1992 - March 9, 1993



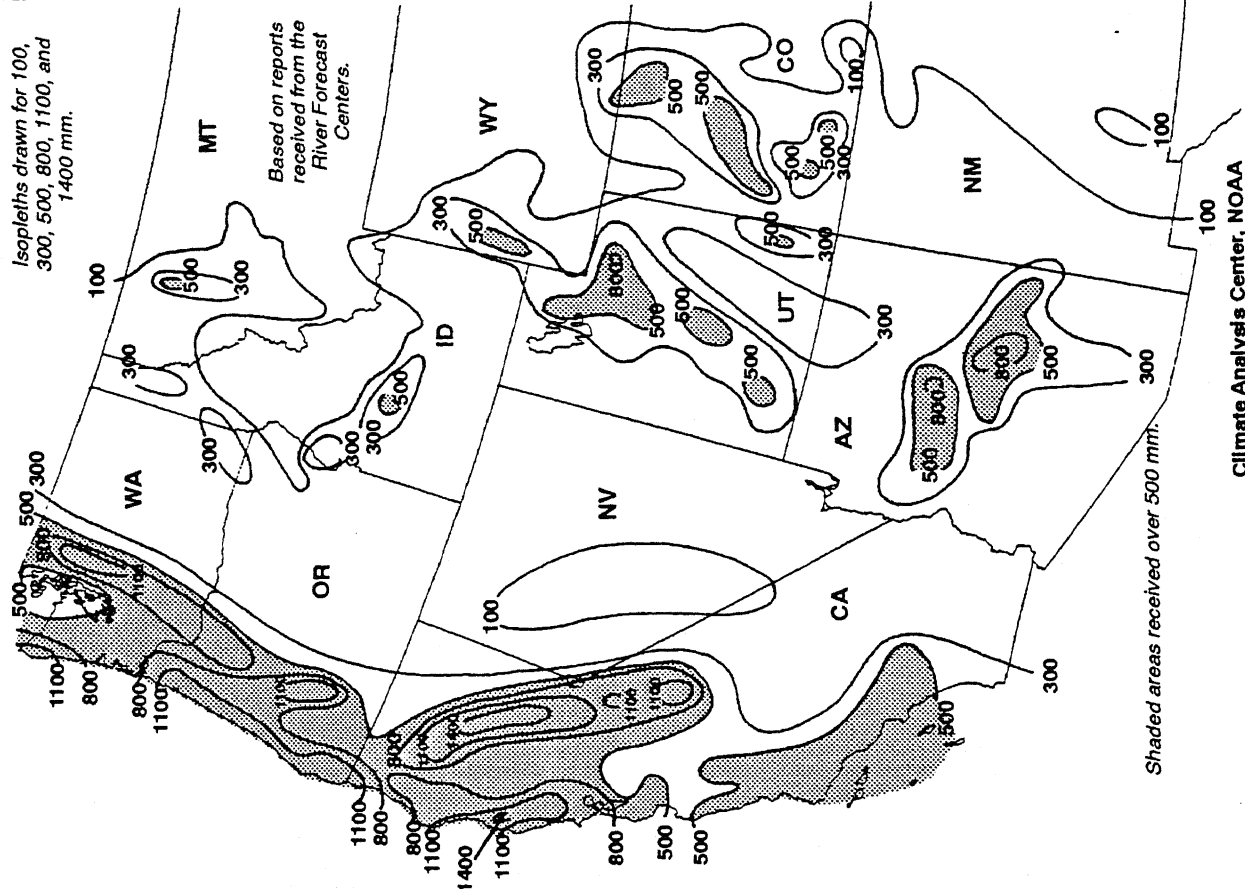
those locations that received near or slightly below normal total precipitation. Farther north, the "coldness" of the storms kept snow water contents only slightly below normal despite significantly lower than normal precipitation totals (page 13). The storm track that brought repeated periods of heavy precipitation to southern and central areas tended to steer moisture away from northern sections of the Pacific Northwest, Intermountain West, Rockies, and High Plains, where most SNOTEL basin averages were only at 65% – 90% of normal for both snow water content and seasonal total precipitation as of March 8. According to the National Climatic Data Center, Washington experienced its 7th driest winter (Dec–Feb) and 2nd driest February since records began in 1895. All other states in the region had above median winter amounts.

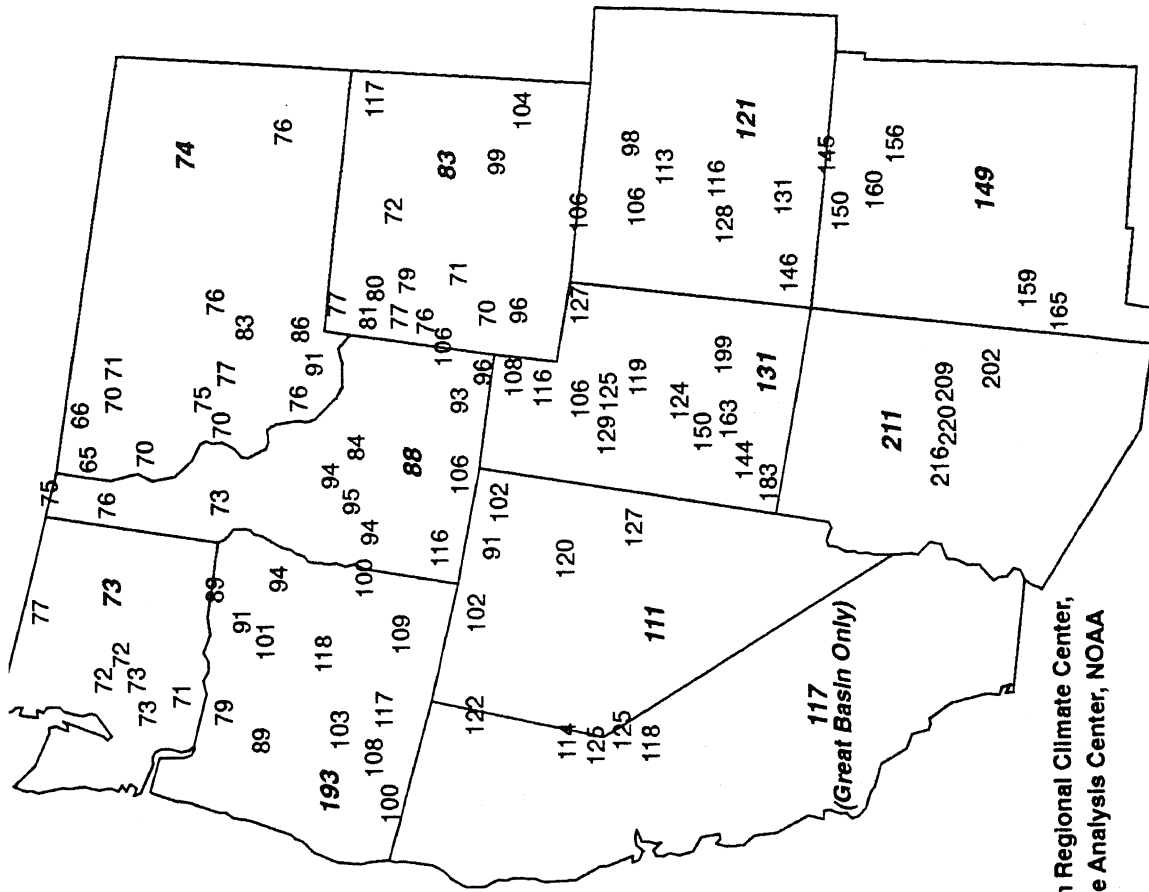
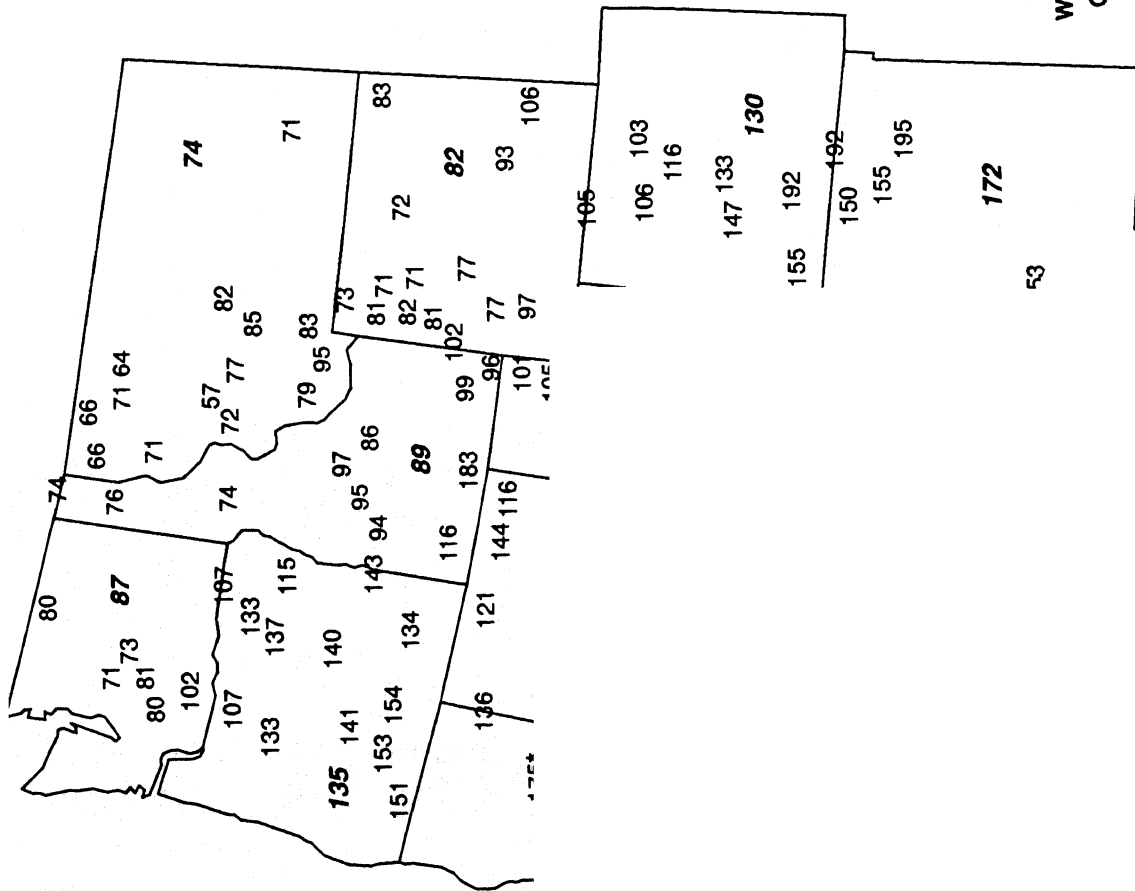
The difference in observed precipitation across the Northwest (ID, OR, WA) as opposed to the Southwest (AZ, CO, NM, UT) is evident on page 14. Although absolute totals were slightly higher in the Northwest, the region experienced its seventh consecutive drier than normal winter while the Southwest observed the wettest winter in 98 years of history by a considerable margin. This is the same general pattern observed last season, and is typical of years with low-index (warm) ENSO conditions. During both the 1991–1992 wet season and the 1992–1993 wet season to date, southern California received copious precipitation; however, the 1992–1993 wet season also brought heavy rain and snow to the state's critical water supply regions in the southern Cascades and the Sierra Nevadas. For the first time in a decade, all three winter months brought well above normal precipitation to each of the state's hydrologic regions (page 16) and to critical sections of northern California (page 17), prompting the governor to declare an end to the prolonged drought and sharply cut back water restrictions that had been implemented during the past seven years. To date, the "good" 1992–1993 wet season has not brought the state's reservoir storages to near normal, but once the huge Sierra Nevada snowpack (which was at 175% – 185% of normal as of March 8) begins large-scale melting as spring continues, storages should increase. The level of Lake Tahoe had risen over 400 mm above the record low levels observed in September 1992, and snowmelt is likely to be sufficient to bring the Lake above its rim for the first time in over two years.

Reservoir storages as a percent of capacity for March 1, 1993 as compared to the 1961–1990 normal and the 1992 value for the same date is depicted on page 17. Arizona, Colorado, and New Mexico remained well above normal for the second consecutive year while California saw marked improvement from last year's low values. Farther north and east, however, reservoir levels either remained at or dropped to well below normal in Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming. Because of the above normal snowpack, levels should increase significantly in Oregon and Utah with the advent of spring, but water supply problems could affect the other states. The current long-term precipitation departure from normal since October 1, 1986 compared to the values reported as of April 11, 1992 (page 18) shows that deficits decreased dramatically across much of California, except in the extreme northeastern corner. Meanwhile, shortages substantially increased through much of Oregon and Washington, especially along the coast where normals are higher.

TOTAL PRECIPITATION (MM)

October 1, 1992 – March 9, 1993

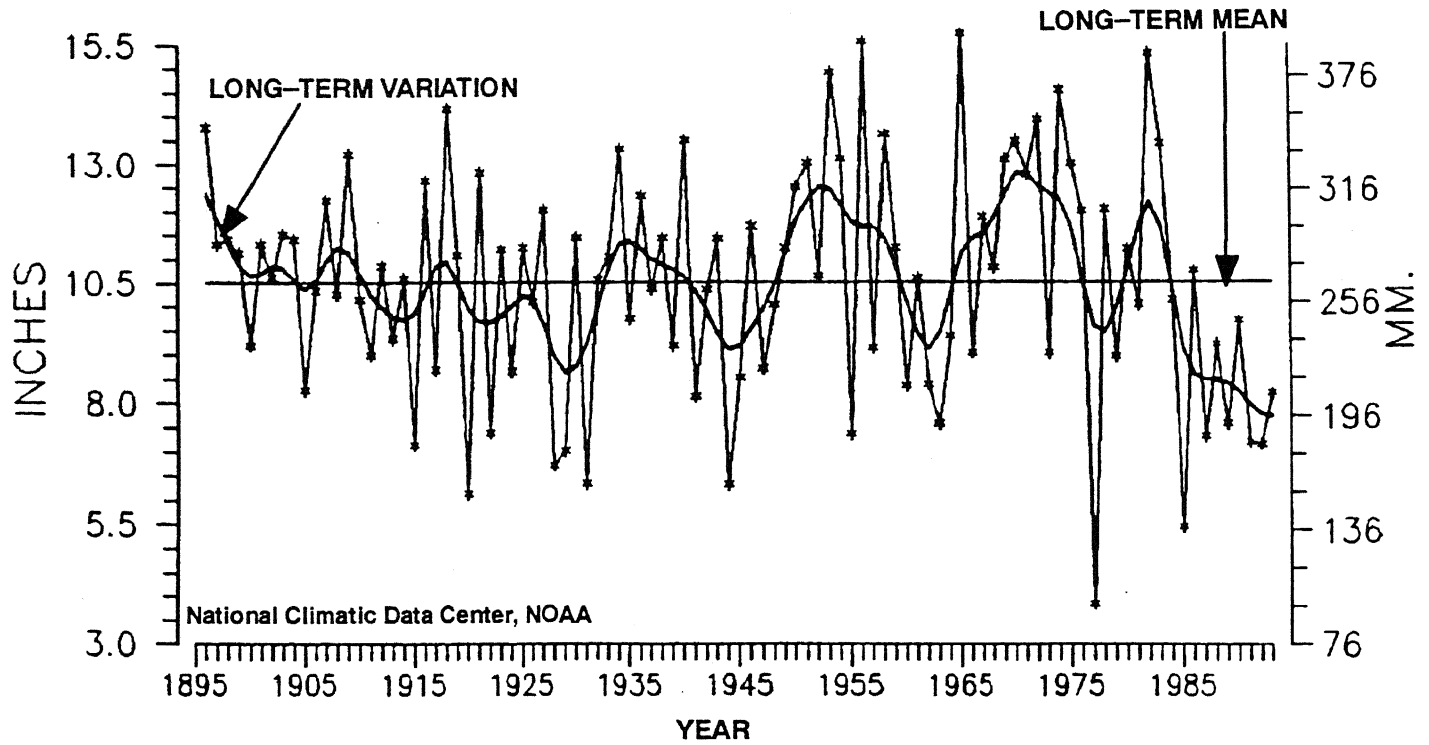




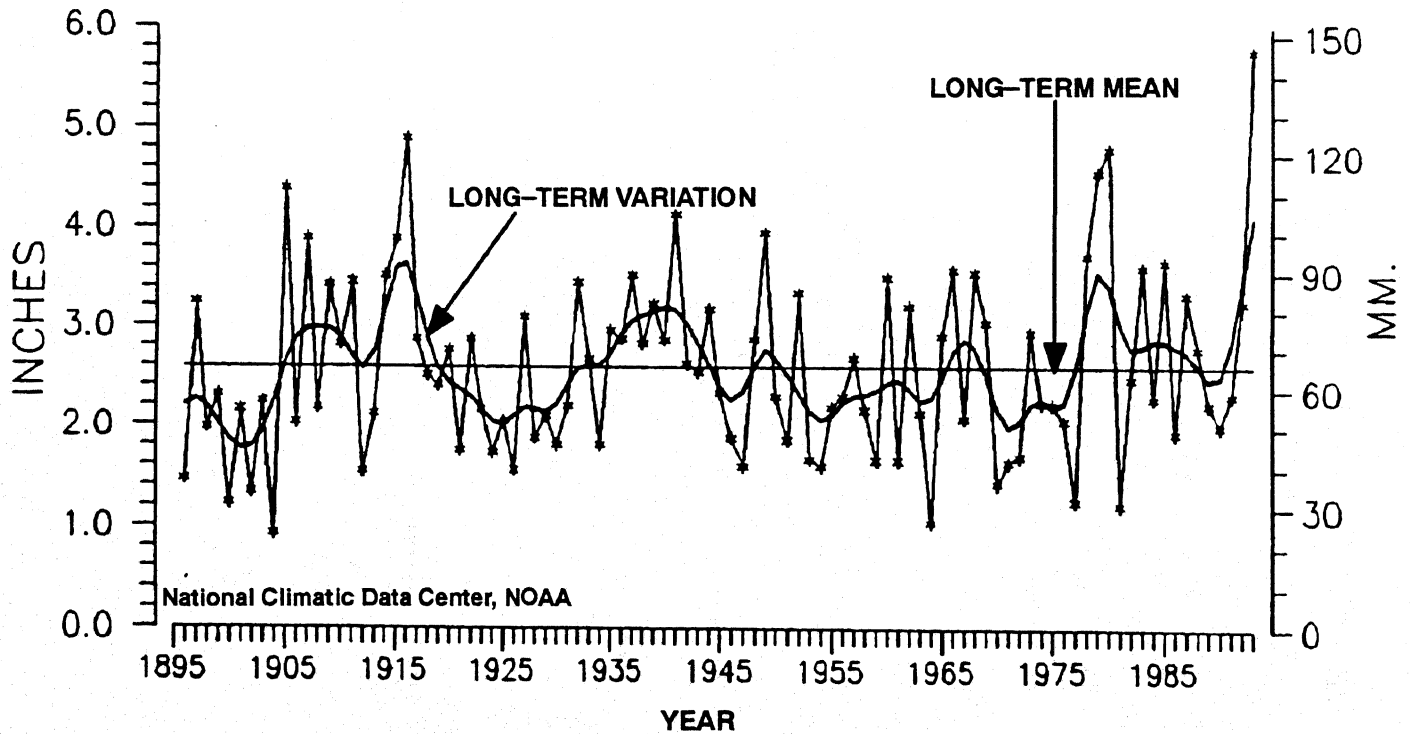
Western Regional Climate Center,
Climate Analysis Center, NOAA

lected river basin averages based on reports from the SNOTEL network, except:
are statewide averages based on the Soil Conservation Service's Snow Survey, and
asterisk (*) are Sierra Nevada averages reported by the California Dept. of Water Resources.

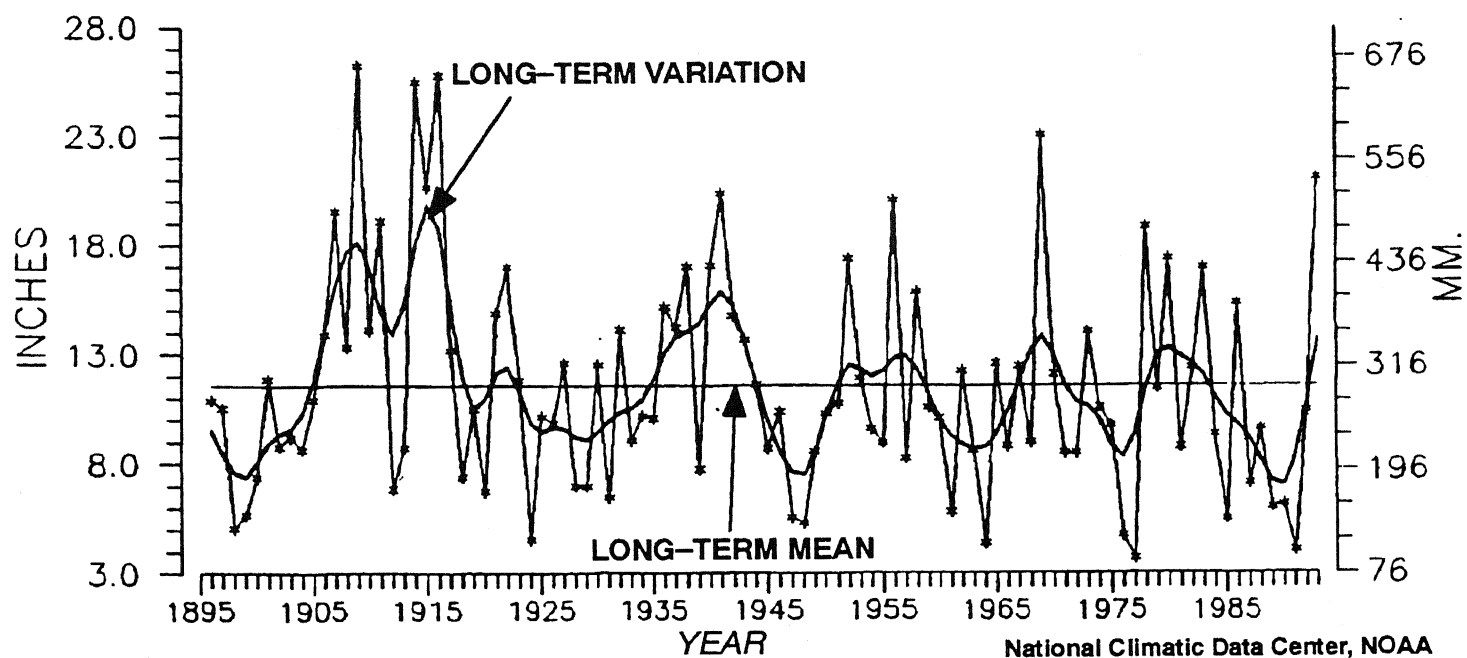
NORTHWEST REGION PRECIPITATION
WINTER (DEC - FEB) 1895/96 - 1992/93



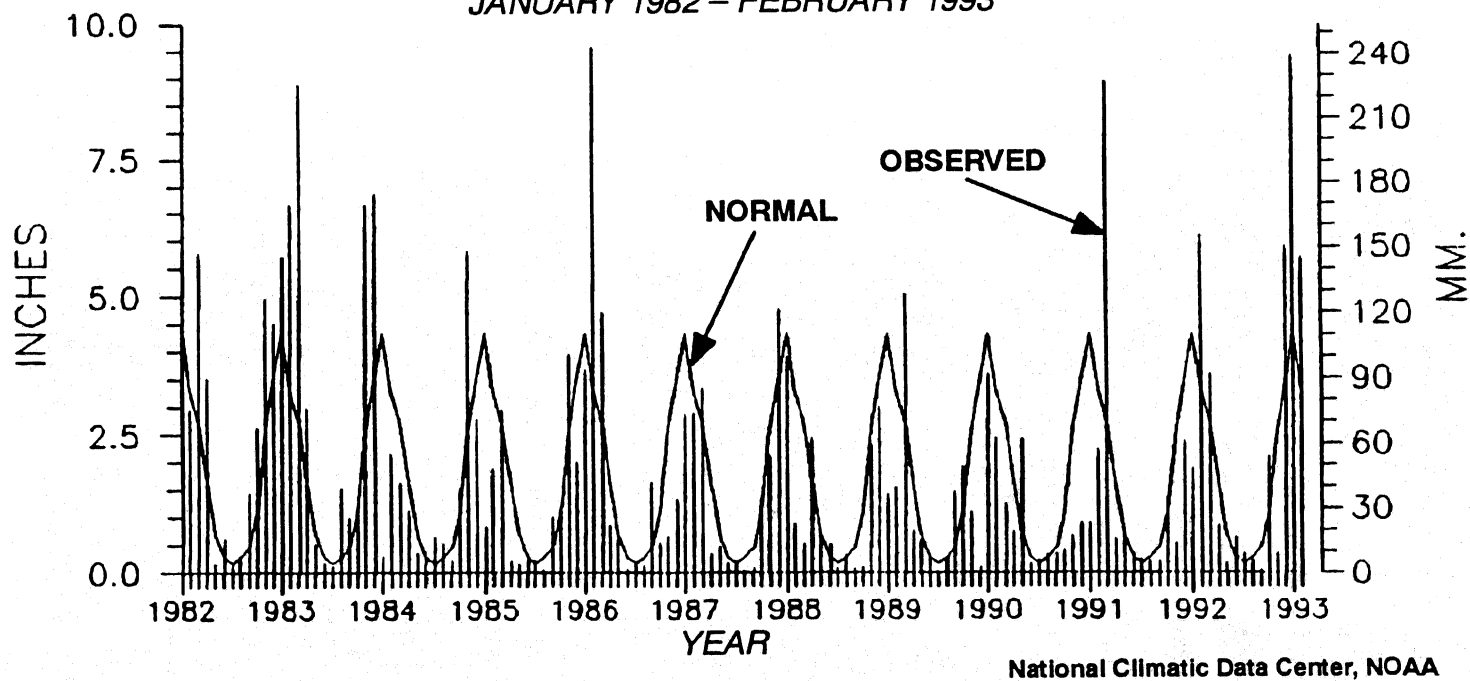
SOUTHWEST REGION PRECIPITATION
WINTER (DEC - FEB) 1895/96 - 1992/93



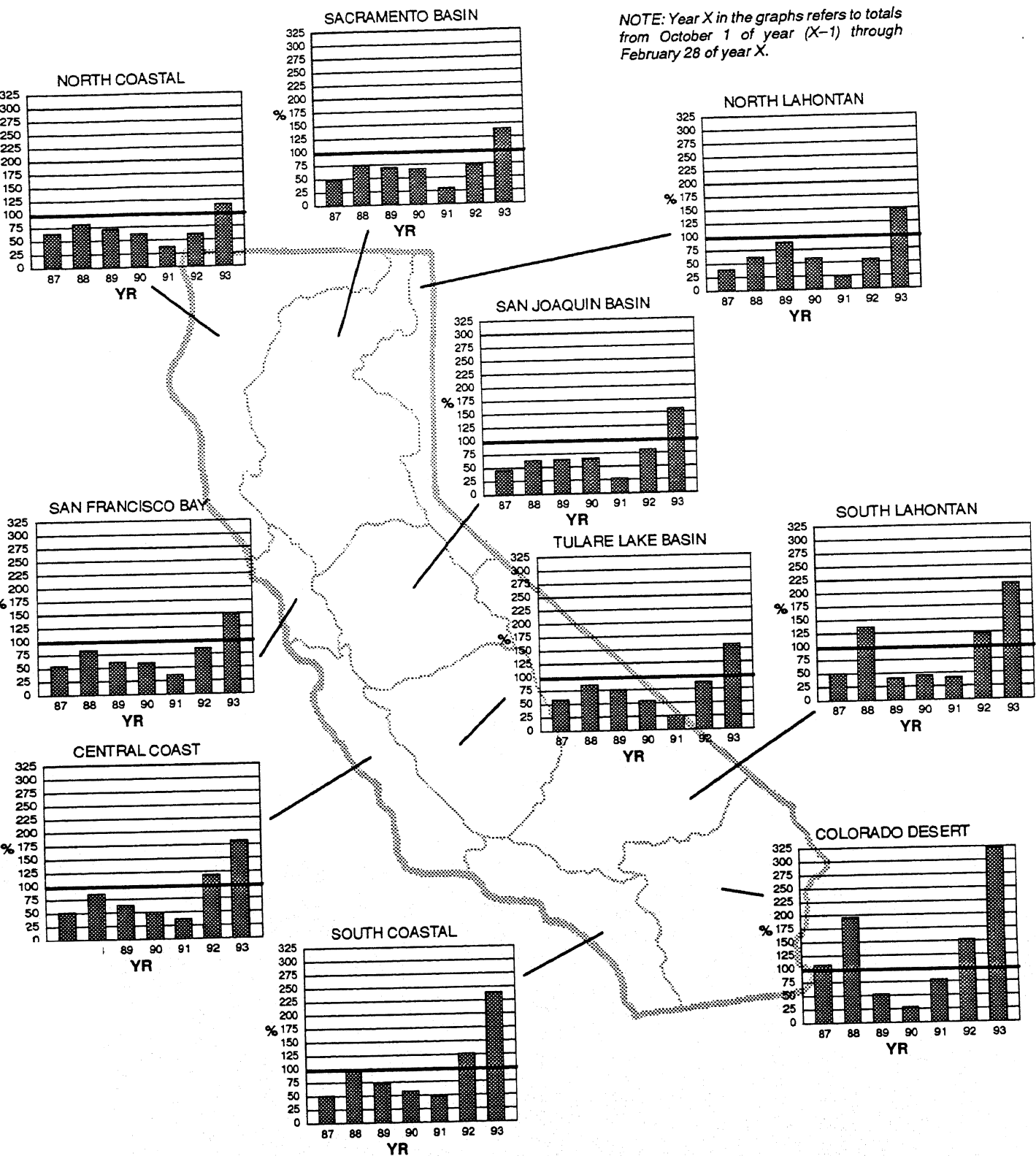
CALIFORNIA STATEWIDE PRECIPITATION **WINTER (DEC-FEB), 1895/96 – 1992/93**



CALIFORNIA STATEWIDE PRECIPITATION **BY MONTH** **JANUARY 1982 – FEBRUARY 1993**

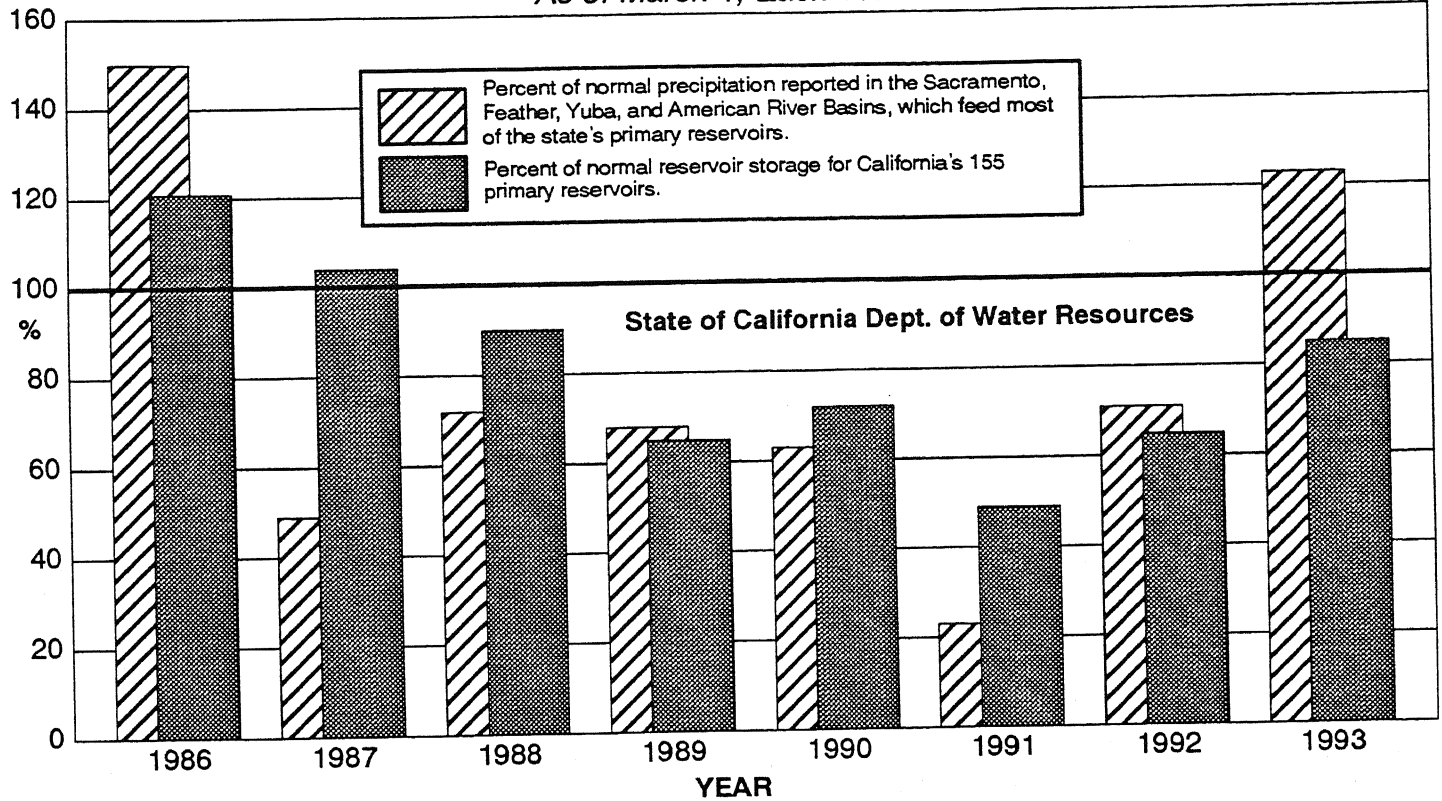


PERCENT OF SEASONAL NORMAL PRECIPITATION BY HYDROLOGIC REGION October – February, Each Year

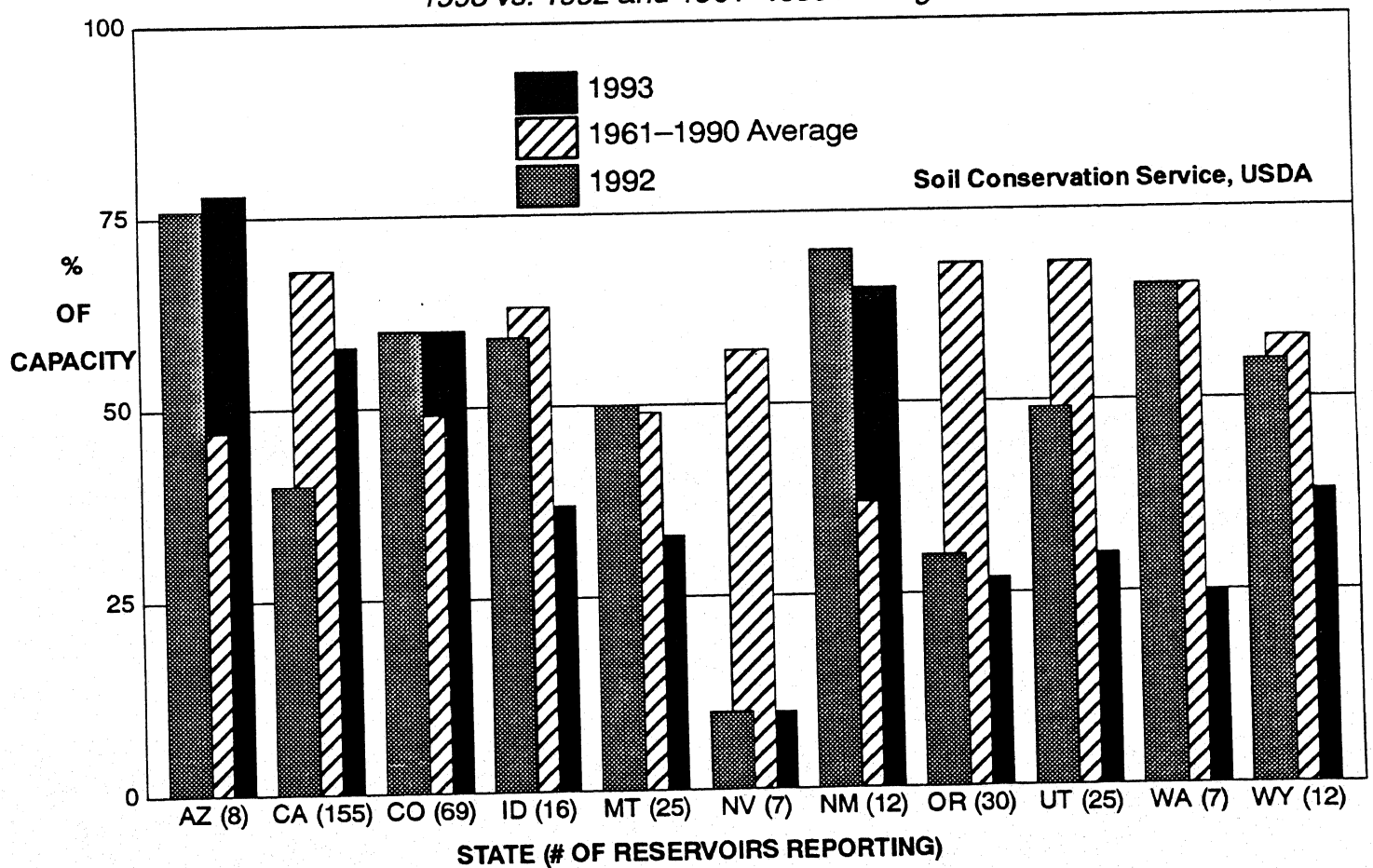


STATE OF CALIFORNIA DEPT. OF WATER RESOURCES

PERCENT OF NORMAL PRECIPITATION and PERCENT OF NORMAL RESERVOIR STORAGE
As of March 1, Each Year



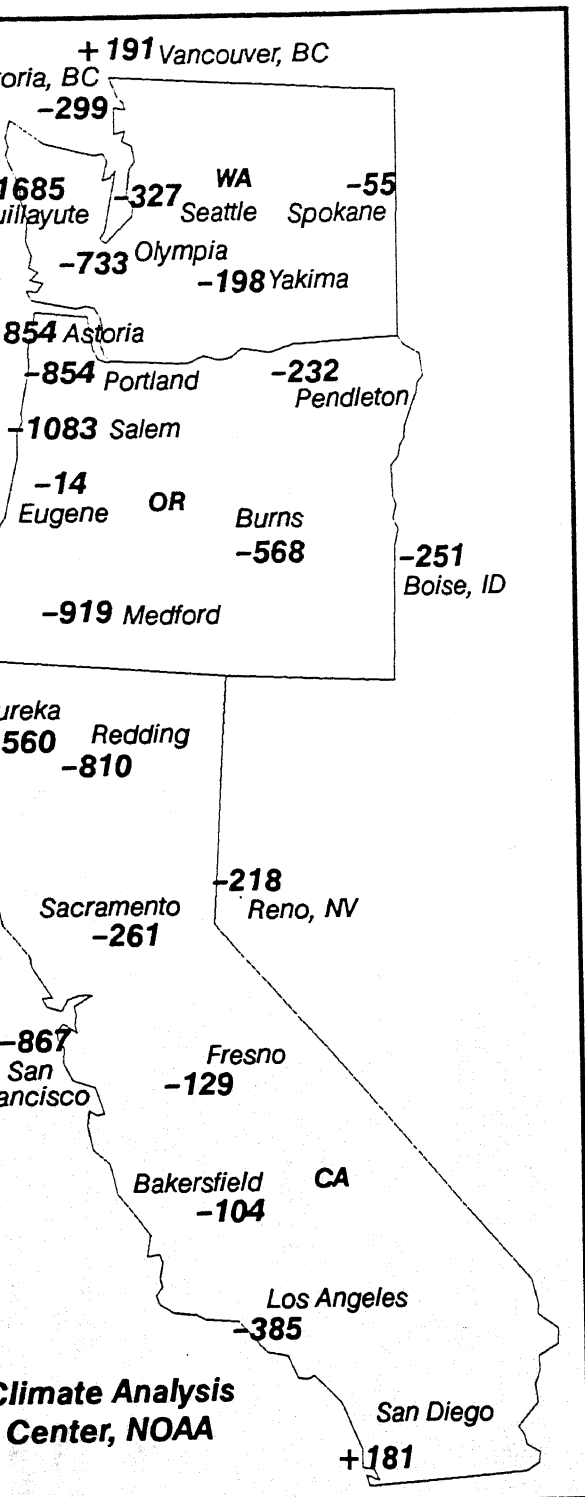
RESERVOIR STORAGE AS A PERCENT OF CAPACITY
1993 vs. 1992 and 1961-1990 Average



LONG-TERM DEPARTURE FROM NORMAL PRECIPITATION (MM)

Since October 1, 1986

Through April 11, 1992



Through March 9, 1993

